MODELING, SIMULATION, AND ANALYSIS FOR STATE AND LOCAL EMERGENCY PLANNING AND RESPONSE

CONCEPT OF OPERATIONS

REPORT DHS82T3

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Introduction

Responding to catastrophic events, man-made or natural, places tremendous demands on governmental organizations at all levels. To respond as efficiently and effectively as possible, these organizations must determine the events, or threats, that are most likely to occur in their area of responsibility, prioritize the threats based on their predicted impact, and determine how to best apply their resources to mitigate, and prepare for, the threats. Because each threat's impact can vary depending on any number of conditions, multiple scenarios must be considered for each threat.

The Department of Homeland Security (DHS) has defined 15 National Planning Scenarios (NPSs), along with a Target Capabilities List, which describes needed capabilities related to the four homeland security mission areas: prevent, protect, respond, and recover. In addition, state and local emergency personnel must have plans in place for managing emergencies in their areas of responsibility.

At-a-Glance

DHS/S&T is working to provide an integrated suite of modeling tools to state and local emergency planners and responders. The ability to use such tools varies greatly among the various local jurisdictions and tribal governments. The challenge is to produce tools that can be utilized by both well-funded jurisdictions and those with less funding and little or no IT support.

In this concept of operations, as well as in two companion documents (a mission needs statement and an operational requirements document), we use the terms *emergency management* (EM) and *emergency services* (ES). We define those terms as follows:

- Emergency management—organizations charged with the managerial function of creating the framework within which communities reduce vulnerability to hazards and cope with disasters.[1] The emergency management community includes local, regional, tribal, and national agencies charged with maintaining the programmatic framework, managing program requirements, and administering local and federal funding.

- Emergency services—organizations that provide for public safety by the delivery of services such as law enforcement, firefighting, emergency medical, search and rescue, and the like. The emergency services community includes all the emergency services providers/responders, including EM agencies.

Emergency management is often described as having a life cycle with specific phases. The three most commonly recognized phases are preparation, response,

[1] FEMA's independent study course IS230, Principles of Emergency Management.

and recovery. Other categorizations exist; for example, the Federal Emergency Management Agency (FEMA) website mentions prevention, mitigation, and risk reduction, but these activities can take place as part of preparation and are not phases, per se.

To support the preparation and response phases at the state, local, and tribal levels, DHS's Directorate for Science and Technology (DHS/S&T) would like to develop a suite of models and other tools that state, local, and tribal planners can use for modeling, simulation, and analysis of likely threat scenarios. DHS/S&T's focus is on enabling its customers, the DHS components, and the components' customers—including federal, state, and local emergency responders—to achieve their vital mission of securing the nation. DHS/S&T also emphasizes that the implementation of such technology must focus on its use as a support "tool" that can augment, but does not in any way replace, essential human decision making.

DHS/S&T tasked LMI with conducting a gap analysis to identify the models and other tools needed by a broad spectrum of ES stakeholders for preparation and response and, considering the results of the gap analysis, with developing a mission needs statement, an operational requirements document, and a concept of operations (CONOPS). This report contains the CONOPS. The CONOPS describes the approach and general plan for the next 5 years to address the requirements of the ES community for models and other tools to support modeling, simulation, and analysis, as described in the mission needs statement and the operational requirements document.

BACKGROUND

The audience for this CONOPS is the ES community, including elected officials; the federal, state, and local agency staffs that support the community; and the first responders. This community needs to work cooperatively to produce the best prevention, protection, preparation, and response with the least investment. To do that, the whole community should work with minimal duplication and no wasted effort—in a word—seamlessly. However, when one considers the multitude of perspectives and responsibilities represented in this community, that goal seems unreachable. Simply consider the fact that each discipline has its own vocabulary, tools, support groups, approaches, and, on occasion, its own funding streams. The discipline lines have been so immutable that DHS has aligned the National Emergency Support Functions along discipline boundaries. Adding to the complexity of developing a solution that will enable seamless operations is the existence of differences in funding available to ES groups, differences in geography, and differences in the threats to each community, to name a few examples.

SCOPE

To best accommodate the complexities related to emergency management at all levels of the ES community, LMI believes that the best solution is a suite of modeling tools that are available via the Internet. In this CONOPS, we present a conceptual solution that satisfies as many of the functional and operational requirements as possible, in a 5-year period.

The CONOPS is limited to a model-sharing application—specifically, a portal—hosted on a DHS website. As noted in the operational requirements document, the ES community has functional requirements related to (1) continuity of operations and (2) the ability to use the same tool to estimate resources in the preparation phase and to refine those estimates in the response phase. Those two requirements refine the scope to include models that can be downloaded and used locally in the event of loss of Internet access during a disaster.

The CONOPS contains more detail for the near term (up to 24 months) than for the outyears. Therefore, this document should be updated annually to provide more detailed information as the project progresses.

KEY STAKEHOLDERS

The following are key stakeholders in the ES community:

- *First responders.* First responders are the local law enforcers, firefighters, emergency medical providers, public health and public works personnel, and others who make up the "front line" serving the public in disasters.

- *Emergency managers.* Emergency managers—at the city, county, state, and other levels—coordinate and organize response across multiple first-responder organizations in a geographic area. Sometimes these managers are in emergency management agencies (EMAs); in other cases, the emergency manager is a single official working with first responders.

- *Emergency management agencies.* Typically, EMAs exist in larger jurisdictions, or jurisdictions where funding for emergency management is consistently available. Consistent funding for EMAs exists when there is a sufficient tax base or when the potential impact of easily understood threats cannot be ignored by elected officials and the public.

- *Federal agencies.* The key federal agencies addressing emergency management are DHS, with its programs for prevention, protection, preparedness, and response; FEMA, with its 10 regional offices; and DHS organizations that administer grant programs. Other stakeholder agencies are the Department of Health and Human Services and several agencies concerned with mapping and geographic information systems (GISs).

STUDY APPROACH

This task called for interviewing stakeholders to gather information about the types of software they need to prepare for and respond to a threat. Our first steps were to draft interview guides (one for state-level EMAs and one for local jurisdictions) and construct a sample of stakeholders who adequately represent the ES community. We strove to include as many types of local jurisdictions as possible, to correct a perceived bias in prior studies toward larger jurisdictions. A team was assembled that included experts in emergency management, information technology (IT), and project and program management, as well as individuals who are experts in eliciting and analyzing software requirements.

The team interviewed state emergency managers individually and conducted group interviews with local jurisdictions to include as many disciplines (emergency management, fire, law enforcement, public works, medical, transportation, etc.) as possible. In addition, the team interviewed non-governmental organizations (NGOs) to understand their needs and their relationships with and dependencies on their government counterparts. We wanted to consider the role of NGOs because they are an integral and important part of many communities across the nation. In other words, we wanted to understand how local jurisdictions can work with their community counterparts and how shared models and tools might be utilized in the field. A total of 90 individuals participated in the interviews. Table 1-1 summarizes the demographics of the interview participants.

Table 1-1. Demographics of the Interview Participants

Population	Jurisdictions	EMA	Fire	Police	PW	Medical	Elected	Other	Total
1–14,999	1 county, 1 city, 1 tribe	3				2			5
15,000–49,999	2 counties	2	1	1		1			5
50,000–99,999	2 counties	3	1						4
100,000–249,999	7 cities, 2 counties, 1 tribal consortium	9	10	2	2	3	1		27
250,000–499,999	3 cities, 4 counties	7	1	1		2			11
500,000–999,999	4 cities	4	2	2	1	3		1	13
1,000,000–4,999,999	1 county, 1 NGO	1				1		1	3
Over 5,000,000	1 city, 1 NGO	1				1		1	3
States	10 states	14					1		15
Pretest	State	4							
Total		44	15	6	3	13	2	3	90

Note: PW = public works.

The team completed a total of 48 individual and group interviews between March and August 2008; 14 of these were with state-level employees, and 32 were with

local jurisdictions (two jurisdictions required a second interview). These jurisdictions were of various sizes and types (rural, city, county, tribal, and large urban areas) and in a variety of geographic locales (island, mountainous, coastal, and plains areas). All interview participants contributed voluntarily, and all information was obtained based on the understanding that it was not for attribution.

The team used a consistent process for all interviews. First, letters were sent to those in our sample to let them know of the study. Then, we discussed the interview concepts and process with four individuals at the state level, refined the interview guides, and began scheduling interviews. In advance of each interview (whether state or local), the team sent participants the interview guide and a description of the purpose of the study and areas of interest. At the local level, the interview included questions on local hazards; planning, training, and exercising; response operations; recovery; daily use of computer tools; funding; and any topic the interviewees wanted to discuss. Interviews were conducted by teleconference; interviewees were offered a copy of the notes taken, if they so wished. In addition, we collected information from the interviewees about the software and other tools that they use.

The team analyzed the interview notes and the information on software and other tools used by the interview participants, as well as considered the mission needs statement and the functional and operational requirements identified in the operational requirements document, to develop this CONOPS. We also considered how to incorporate the 15 NPSs and the Target Capabilities List developed by DHS. Finally, we considered the work being done by Dr. Charles Hutchings, the director of the recently established office for modeling and simulation within DHS/S&T's Test and Standards Division. Dr. Hutchings is developing the vision and strategic plan for modeling and simulation.

ORGANIZATION OF THIS REPORT

The remainder of this report is organized as follows:

- Chapter 2 describes the current environment in which the ES community must operate.
- Chapter 3 describes the desired changes to address the issues in the current environment; it also identifies changes considered but not included.
- Chapter 4 contains a high-level description of the proposed solution, discusses proposed modes of operation and modes for continuity of operations, and identifies the primary users of the solution.
- Chapter 5 describes the anticipated operational and organizational impacts of the portal on the users, system developers, and the support and maintenance organizations.

Chapter 2
Current Environment

This chapter describes the current environment in which the ES community must operate. It begins with an overview. It then addresses constraints and other factors faced by the ES community and briefly describes current modes of operation, current users and stakeholders, and the current support environment.

OVERVIEW

A number of models are available to the ES community, but among the jurisdictions we interviewed, use of models ranged from none at all to the use of several models. Models and other software tools may be commercially licensed, while some (usually those developed by a government agency or an association) are available without licensing fees. In the latter case, the models sometimes are available only to members of an association or an agency. Even if models have no licensing fees, they still have costs associated with installing the model, obtaining the needed supporting software (such as an Oracle database needed to work with a model), training users, maintaining the data to feed into the model, and maintaining the installed model software.

In the majority of cases, interviewees said they have as much modeling capability as they can support, but recognized that they may not have all the modeling capability they need. No jurisdiction used all of the available pertinent models. Interviewees were sometimes unaware of models designed to satisfy a stated need, and in other cases, even if a model was freely available to meet a need, they did not have the resources to obtain, implement, use, and maintain it.[1]

The lack of a suite of models and other tools hampers effective planning and response for all hazards, including the NPSs. The ES community has many methods, processes, and tools, both automated and manual, that they use for preparedness planning. However, this community has no mechanism for sharing these methods, processes, and tools or for integrating them into a cohesive suite. Moreover, no mechanism is in place to notify the emergency preparedness community of updates, new tools, or new methods and capabilities available.

Also lacking in the current ES environment are guidelines for licensing commercial off-the-shelf software products used by the ES community. Therefore,

[1] For a list of the software currently in use by the jurisdictions we interviewed, see LMI, *Modeling, Simulation, and Analysis for State and Local Emergency Planning and Response: Operational Requirements Document*, Report DHS82T2, January 2009.

jurisdictions do not get the benefits of group licensing, volume pricing and discounts, or maintenance options for systems. Guidelines on software acquisition and software implementation also are limited, although some state-level guidelines exist in some states. DHS does not know what tools are used by the community as a whole, particularly in the less-populated and rural areas.

Sharing of methods, information, and data between levels and entities within and across state and local jurisdictions in the community needs to be improved. In addition, interoperability is a growing need within the community. In the current environment, the only way DHS can learn how prepared an area or a jurisdiction is for any of the NPSs is through a survey or a data call.

In the current planning landscape, DHS cannot readily assess how prepared any jurisdiction or region is, for any particular hazard. Because the majority of the information on threats, hazards, preventive measures, and preparedness is generated by state and local planners and responders, they need better tools for planning, including modeling, simulation, and analysis tools. For example, they now have no tools for readily locating or collecting data needed to run models, capturing and preparing the data, and developing estimates of the likely impact of various scenarios and thus estimate what is needed for response. Some of the tools they need pertain to determining what software or model will help, how to determine the best choice of software or model for a given purpose, and what resources may be required for training and maintenance. Such tools will enable better planning and response for all hazards at the state and local levels, as well as enable better assessment of nationwide levels of preparedness.

The ES community requires consistent use of a common suite of tools to support incident planning and the assessment of preparedness levels for all hazards. Currently, automated models and tools, and IT support for these tools, is limited in many jurisdictions. The suite of tools should be developed in partnership with the ES community and considering its specific needs, particularly in the areas of look and feel, level of complexity, amount of detail, transparency, interoperability, and ease of use. In addition, because the tools will support all incident management phases, the tool suite should be robust, accommodate a broad range of scenarios, and accept data inputs at all jurisdiction levels. The models and tools will support other critical areas such as mitigation, risk reduction, and recovery beyond the incident.

CONSTRAINTS AND OTHER FACTORS

The current ES environment is faced with many constraints and other limiting factors. Jurisdictions mainly rely on localized tools or tools provided by their state to perform preparation and response activities. This presents challenges in many areas:

- Differences in methods and processes in planning among jurisdictions make collaboration difficult.

- Policies and procedures differ among jurisdictions.
- Training is problematic, because it requires jurisdictions to expend man-hours and labor to train personnel on their own set of tools, instead of having centralized training offered by the state, region, or DHS.
- Funding is limited, particularly at the local level. A centralized suite of models and tools would pave the way to centralize and streamline funding allocations, freeing more dollars for maintenance and support.
- Different jurisdictions often have different versions of the same software, putting a burden on ES personnel to retain software knowledge and on IT support personnel for supporting and maintaining different software.
- When DHS changes or modifies its guidance, jurisdictions cannot comply promptly without significant labor and cost.

An environment in which jurisdictions can access models and tools centrally will enable streamlining of processes and increased collaboration and sharing of knowledge and best practices among ES personnel. However, realizing such an environment will be challenging. It will involve many stakeholders such as personnel at the national, state, and local levels; numerous disciplines (EM, fire, law enforcement, public works, etc.); and external organizations that interact and work with the jurisdictions such as NGOs and federal agencies beyond DHS.

CURRENT SYSTEMS/TOOLS AND MODES OF OPERATION

The current ES environment is completely localized; various systems have been developed and hosted by groups at the state and local levels. In some cases, local jurisdictions have procured the same software procured by their state, so multiple implementations of the same software can be found in the same state. Some jurisdictions have shared tools among their disciplines to foster information exchange and better collaboration. But tool support is limited, and ongoing maintenance for tools is sporadic, unstructured, and highly tied to availability of funds. These operational risks are associated with localized software use by the jurisdictions. With centralized models and tools, jurisdictions could mitigate many of the risks they would have if they were to maintain this software locally, and the regions and states could support them more effectively.

Although the focus is on the users at the state and local levels, centralized models and tools also could support some DHS-level functions as well. All data that start as local planning and analysis data should merge into state-level information and data. In current practice, some jurisdictions use no software at all, while others use software for some functions but not others. Even in large cities, some planning functions are unsupported by software. Thus, the existence of good, reliable data is undetermined. Even when good data exist, in most cases, the data cannot

be aggregated without considerable human intervention, using up crucial resources for data analysis.

If state and local jurisdictions use consistent processes, tools, and data to plan and respond, their data become more consistent. If DHS-level users would like to aggregate data at a regional or other level to determine, for example, how prepared an area is for one of the NPSs, DHS must provide standard processes, tools, and business rules so that data can be aggregated accurately.

CURRENT USERS AND STAKEHOLDERS

Users and stakeholders in the ES community include personnel from the fire, police, and public works departments; people involved with GISs and the Metropolitan Medical Response System; emergency managers; elected officials; and many others. The EM community also encompasses all public-sector jurisdictional levels: local, city, county, state, regional, and national. Other potential users include organizations such as NGOs, tribal communities, private entities, volunteer organizations, and the general public.

Users at the state and local levels can be characterized according to their focus on a particular phase of emergency management, or by their discipline, or by their subject matter expertise. To characterize users according to their discipline or subject matter expertise, we use the Emergency Support Functions (ESFs):

1. Transportation
2. Communications
3. Public works and engineering
4. Firefighting
5. Emergency management
6. Mass care, emergency assistance, housing, and human services
7. Logistics management and resource support
8. Public health and medical services
9. Search and rescue
10. Oil and hazardous materials response
11. Agriculture and natural resources
12. Energy

13. Public safety and security
14. Long-term community recovery
15. External affairs.

CURRENT SUPPORT ENVIRONMENT

Currently, each jurisdiction determines its own needs for tools, procures the tools it believes will be most useful, and supports those tools. This means that various software packages are supported either at the state or local level. All support for planning and response comes from the jurisdiction, with the exception of specific grants (for example, to prepare for pandemic influenza). Almost all of the models being used are available at no cost from federal agencies, although some small estimating tools (built using Microsoft Office software such as Excel or Access) have been developed locally or under small contracts. These tools are supplemented by experience-based planning done in meetings that bring all the disciplines in a jurisdiction together.

Chapter 3
Justification and Description of Changes

Now that DHS has issued the NPSs, it will probably be required to report on the state of readiness by geographic area (for a particular congressional district, for example). However, the EM community has no efficient, accurate, and effective way to assess readiness or consistently report on preparedness in different geographic areas. This deficiency makes it difficult for DHS to determine where to best invest its grant monies for emergency management, particularly in an environment of mounting budget pressures and fluctuating federal priorities.

Some EM planning models have been developed under federal and state sponsorship, but they are not available from a single source, nor do they use a single source of data. Table 3-1 lists the NPSs and identifies models that support them. Many of the scenarios are supported by the Electronic Mass Casualty Assessment and Planning Scenarios (EMCAPS) system, which comprises a set of PC-based models developed by Johns Hopkins University. In addition, two NPSs are supported by FEMA's Hazards U.S. Multi-Hazard (HAZUS-MH), a powerful risk assessment software program for analyzing potential losses from floods, hurricane winds, and earthquakes.

Table 3-1. National Planning Scenarios and Planning Models

Scenario	Model
Improvised nuclear device	
Aerosol anthrax	EMCAPS: Inhalational Anthrax
Pandemic influenza	EMCAPS: Pandemic Influenza; CDC FluSurge Model
Plague	EMCAPS: Pneumonic Plague
Blister agent	EMCAPS: Blister Agent–Mustard Gas
Toxic industrial chemicals	
Nerve agent	EMCAPS: Nerve Agent–Sarin
Chlorine tank explosion	EMCAPS: Toxic Gas-Chlorine
Major earthquake	FEMA: HAZUS-MH
Major hurricane	FEMA: HAZUS-MH
Radiological dispersal device	EMCAPS: RDD: Dirty Bomb
Improvised explosive device	EMCAPS: IED–Truck Bomb
Food contamination	EMCAPS: Food Contamination GI Anthrax
Foreign animal disease	
Cyber attack	

In addition to the models themselves, the EM community needs a single source of information on the processes they can use for planning and on the tools (such as models and data sets, as well as plan templates) available for planning; they also need access to the tools and models themselves, along with training in their use. The models and tools should support a consistent process and use a consistent vocabulary for describing resources. When resources for response are consistently described and plans are stored in consistent locations (either at the state, regional, or national level), the combined resources available for responding to a threat in a geographic area can be assessed quickly.

The following sections identify the specific changes desired to address the issues in the current environment and identify changes considered but not included.

DESIRED CHANGES

The following are changes needed to address the key issues in the current environment:

1. Provide a new web-based system—a portal—that users can access via a personal computer (PC) with a web browser. This website must be secure, with a mechanism to provide access as needed.

2. Provide the capability to any jurisdiction, no matter its funding or resources, to do the following:

   - Assess overall risk
   - Conduct in-depth analyses of high-risk hazards and threats
   - Analyze low-probability/high-impact threats
   - Identify the resources needed to respond to threats
   - Develop response plans for identified threats
   - Develop asset management data (resource, status, location, etc.) for resources in plans
   - Provide a standardized asset management database, so resources needed for response in a geographic area (i.e., regional response) can be located.

3. Provide information on self-assessment for tools and processes needed and on the approach to their adoption.

4. Provide a system to support online (and on-demand, if feasible) training on state and local planning processes and on the use of the planning tools available via the new web-based system.

5. Provide reference and training materials for training via other means (train-the-trainer, etc.).

6. Provide these capabilities to all planners via the web, and enable use of the needed tools on local area networks and standalone PCs (may be scaled-down versions of tools).

7. Provide print formats for all information needed for response under adverse conditions (no networks, no power, no access to operations centers).

8. Provide information on the use of provided tools (models, data sets, planning and response processes, etc.) by jurisdictions, according to jurisdiction profiles (threats, size of population served, services directly provided, geography, etc.).

The highest priorities are changes 1, 2, and 7; these should be present when the portal is first released for use. The next priorities are changes 4 and 5, which should be added as soon as possible after portal release. Finally, changes 3, 6, and 8 should be implemented.

CHANGES CONSIDERED BUT NOT INCLUDED

The LMI team considered including a maturity model in which jurisdictions could determine their level of modeling and simulation maturity, relative to other jurisdictions. This model would use the materials that the portal provides and show a clear adoption path for achieving greater levels of proficiency in using models to better estimate, plan, and improve preparation and response over a multiyear period. We set this concept aside, because the change management challenge of getting users to adopt the portal environment will be sufficient for the first several years. The maturity model concept may be reexamined during portal design, in discussing user priorities for development.

Chapter 4
Proposed Solution

This chapter contains a high-level description of the proposed solution, discusses proposed modes of operation and modes for continuity of operations, and identifies the primary users of the solution.

DESCRIPTION OF THE PROPOSED SOLUTION

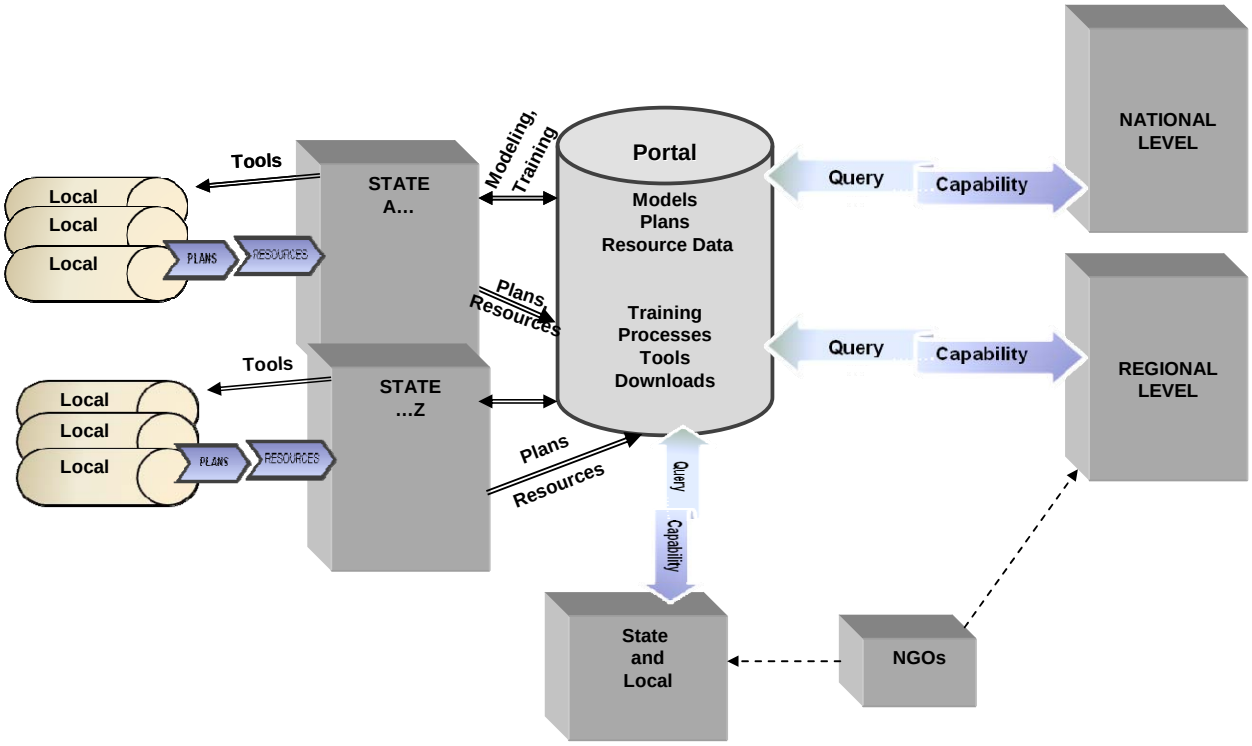
As described previously, models exist for many of the threats planners must consider. Those models will be provided via a single website, along with data sets, instructions, training, guidance on processes for use of the tools, guidance for assessing which tools are needed and how to implement them, and guidance for networking with peers facing similar challenges. The best way to provide these various resources to a wide range of users is a portal.

A portal will allow easier administration of the delivery of these resources to the varied user base. Using standard portal functions of user groups and user profiles, DHS can deliver the right set of functions to each user of the portal and can simplify navigation so users are not overwhelmed with content and functionality. Figure 4-1 illustrates the concept. In the configuration shown in the figure, all jurisdictions—50 states, U.S. territories, tribal nations, and local jurisdictions of all types—would use a single portal.

The portal architecture should enable its replication in different levels of jurisdiction. For example, a FEMA region might want to use a similar system of functionality and repositories to create a regional picture of threats, response plans, and resources. In that case, the region-level portals would be the systems that DHS would query to compile a national picture of readiness.

To satisfy the requirement for a fairly low-cost, easy-to-implement portal that uses commonly available hardware and operating system software, DHS should consider Microsoft's Share Point portal architecture. This architecture will be low-cost for DHS to develop and would be a model for adoption at other jurisdiction levels (region, state, etc.).

Figure 4-1. Conceptual Design of the Web-Based Delivery of Models and Associated Tools



The portal should include the following:

- The EMCAPS and HAZUS-MH models (listed in Table 3-1) and other freely available models commonly used by this community such as ALOHA, CAMEO, and MARPLOT.
- All the supporting software needed to use those models (for example, the Evaluation Edition of ESRI® ArcGIS 9.2 needed for HAZUS-MH MR3).
- Other supporting materials—users guides, data sets, etc.—needed to use those models. For example, the portal should include the HAZUS-MH Risk Assessment User Series publications and the data sets for all 50 states, the District of Columbia, and Puerto Rico.
- A process for self-assessment to identify the tools that would be most useful for a given jurisdiction and the best approach to using those tools. For example, users will need information on the training needed to use the tool effectively and on the order in which to use or implement each tool.
- A guide to characterizing resources (both equipment and personnel) consistently, so all response plans use the same vocabulary to describe every instance of identical resources. The guide should include both the cataloging rules and standard resource descriptions based in the National Incident

Management (NIMS) Integration Center (NIC) Resource Typing Initiative and the National Credentialing System initiative.

- Training materials for all of the above items.
- Multiple feedback mechanisms to gather user input on what works and does not work with respect to the portal. Examples of such mechanisms are surveys of users to determine their satisfaction with training and provision of multiple feedback gathering points—on the portal itself, as well as on each tool.
- Model outputs in exportable formats where possible, for download to local systems in, for example, formats suitable for import by standard Microsoft Office tools, such as Excel, Access, or Word.
- A capability to download and run models (in a scaled-down version, if needed) on users' PCs, with a data synchronization routine that will update the users' model libraries on the portal when they have reconnected to the portal.

The portal should be available at no cost to users.

The portal should be backed up to an alternate hot site, preferably in a sufficiently distant geographic location that the alternate site is not subject to the same threats as the primary site. Users should be able to operate without the portal, but the portal should be available round-the-clock.

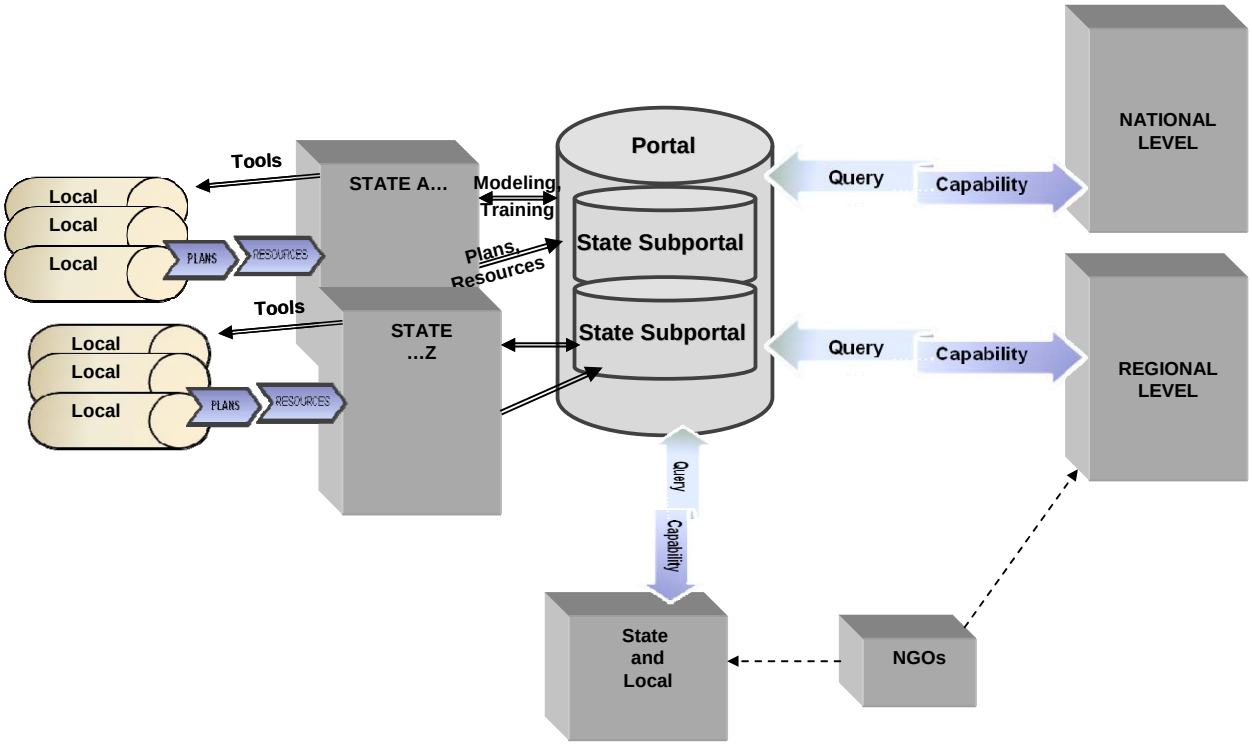
Given the need for uptime, the portal should be treated as a critical infrastructure component and secured accordingly, both from cyber and physical attack.

PROPOSED MODES OF OPERATION

The first release of the portal should be a single instance, with a sample of jurisdictions participating in its use: several states from multiple regions and a sample of each size jurisdiction within each state. For example, if three regions, with two states per region, and five jurisdictions per state participate, the portal would have a user group of 30 jurisdictions involved in initial testing. During this period, users would provide feedback on the range of models available, the existence of any gaps (that is, any hazards/threats that are not supported), the usefulness of the models provided, the ease of locating the models and associated tools, and the ease of using the models' outputs for planning and other factors.

Figure 4-2 depicts the mode of operation at the national level.

Figure 4-2. Portal Mode of Operation: National Level



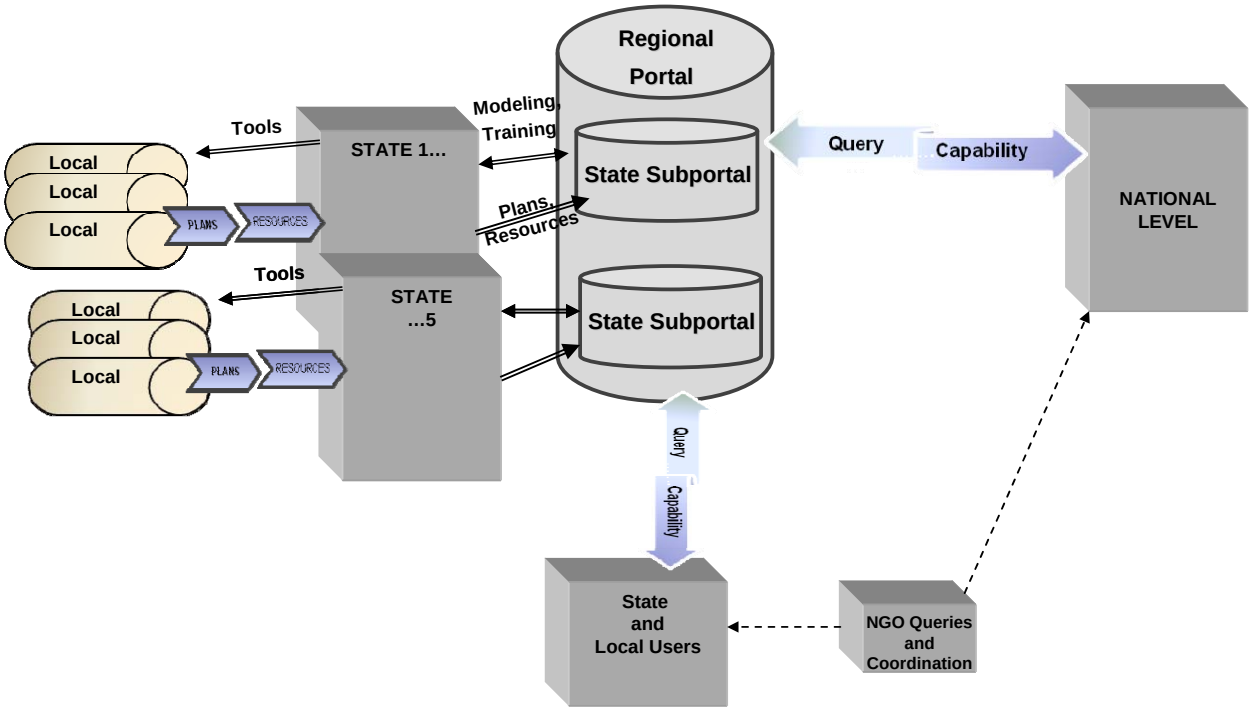
When this testing period is complete, the portal should be improved according to DHS and user priorities and then should be released to the initial group of users. If the user group and the portal providers agree, the portal should then be released to a larger group—perhaps all the states within the original regions, or similar sampling in more regions. The decision on what jurisdictions to include in the phased rollout cannot be made until the portal design is finalized with users and until users and developers reach consensus on the rollout plan. An alternate mode of operation, to be decided upon after initial testing, is to provide an instance of the portal in each FEMA region.

MODES FOR CONTINUITY OF OPERATIONS

An alternative to using a single hot site for backup and continuity of operations is to have an instance of the portal for each region. The establishment of multiple portal sites supports both continuity of operations and load balancing. Each region could act as a hot site for one other region from a different area of the country and could provide load balancing when needed.

Figure 4-3 depicts the portal configuration for a single region.

Figure 4-3. Portal Configuration for a Single Region



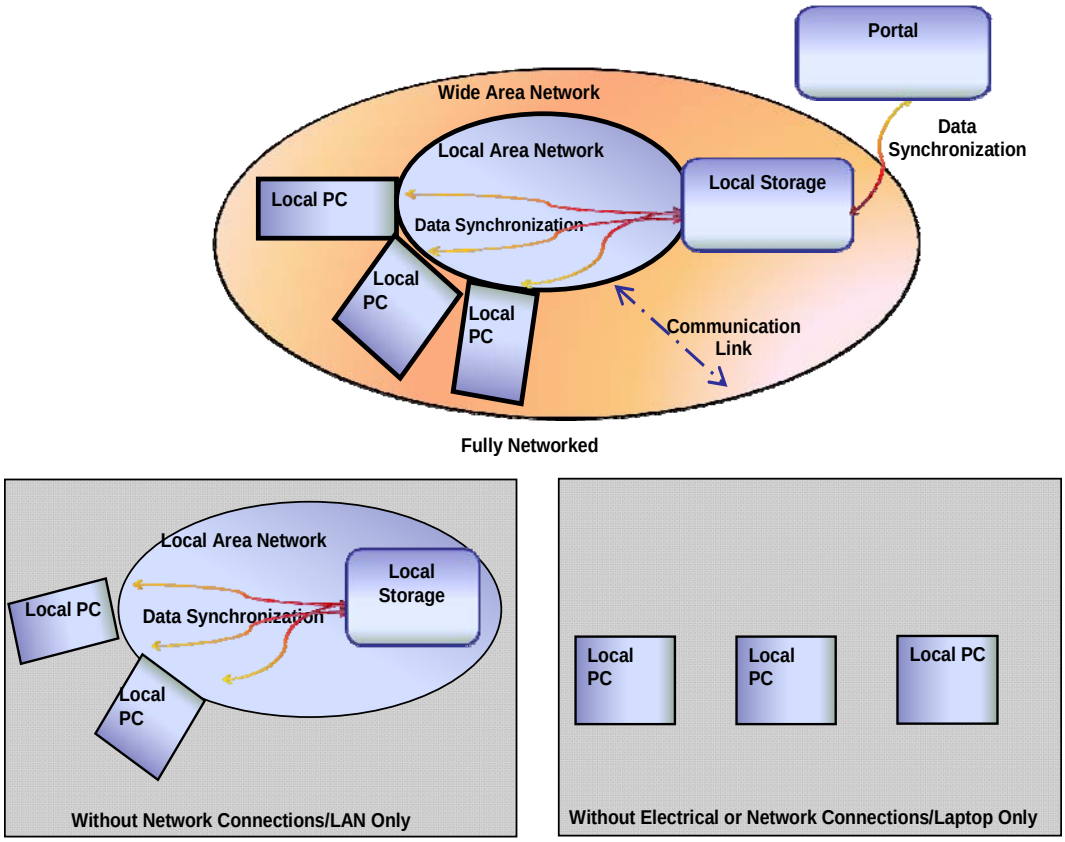
From the user's perspective, there are two modes of use:

- *Connect to the portal using a PC with a web browser and use the models and other tools via the browser (client).* All operations and data storage occur on the portal (server).

- *Connect to the portal using a PC with a web browser and download selected models to operate on local infrastructure (local area network, local servers, local PCs).* The results from model runs will be stored on the local infrastructure (LAN server or PC), as well as uploaded to the user's model library storage area on the portal. In this case, a data synchronization function will be available to ensure that model results incorporated into plans are updated both on the local infrastructure and on the portal.

Figure 4-4 depicts these modes of operation.

Figure 4-4. Users' Modes of Operation at the Local Level



ANTICIPATED USERS

The following entities will be the primary users of the portal:

- Individuals with responsibility to develop emergency response plans at all levels of jurisdictions (local, state, region, etc.) and types of jurisdictions (tribes, territories, etc.)
- FEMA regional personnel who work with the jurisdictions in their region to improve emergency preparedness, including planning and mitigation.

Chapter 5
Summary of Impacts

This chapter describes the anticipated operational and organizational impacts of the portal on users, system developers, and support and maintenance organizations. It also describes the temporary impacts as the portal is being developed. This information will allow all affected organizations to prepare for the changes that will be brought about by the new system and to plan for the impacts during development and transition to the new system.

OPERATIONAL IMPACTS

The portal will have the following major impacts on operations:

- Every emergency planner in the United States will have access to a model he or she can run in order to estimate response requirements.
- Every planner will have access to models for estimating their jurisdiction's response requirements for the NPSs.
- Jurisdictions will be able to use models without having to
  - spend time researching and finding them,
  - arrange to obtain them or pay licensing fees,
  - install them and the associated support software, and
  - maintain them.
- Many smaller jurisdictions will be able to use models for the first time.
- It will be possible to assess the state of planning by jurisdiction, geographic area, FEMA region, etc., with a significant reduction in effort.

ORGANIZATIONAL IMPACTS

Once users have begun using the models and developing their plans, it will be possible to gather information on a geographic area's status with regard to planning and preparedness. Currently, gathering that type of data requires phone calls and e-mails from the region to jurisdictions in the area and manual assessment of the state of plans in the area.

IMPACTS DURING DEVELOPMENT

A sample of users will be involved during portal development to provide priorities, provide feedback on proposed solutions, refine requirements, and identify factors critical to large-scale, nationwide buy-in to the solution. They may be required to travel (using project funding) and to attend web-based meetings and demonstrations of tools, portal functions, and training. In addition, they will evaluate initial operating capability and subsequent versions of the portal and its component tools.

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14. ABSTRACT

The Department of Homeland Security provides support to 'first responders' in jurisdictions throughout the United States. These responders must plan for various threats and their response to various emergency scenarios. Under this task, LMI gathered requirements from a sample of the emergency management community at the local, state, and tribal levels. This Concept of Operations addresses the requirement for modeling and simulation to support various emergency management functions and the requirements for training, maintenance, and other support to enable the use of modeling and simulation software.

15. SUBJECT TERMS
modeling, simulation, and analysis; state and local emergency planning and response; concept of operations; Department of Homeland Security; first responders

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